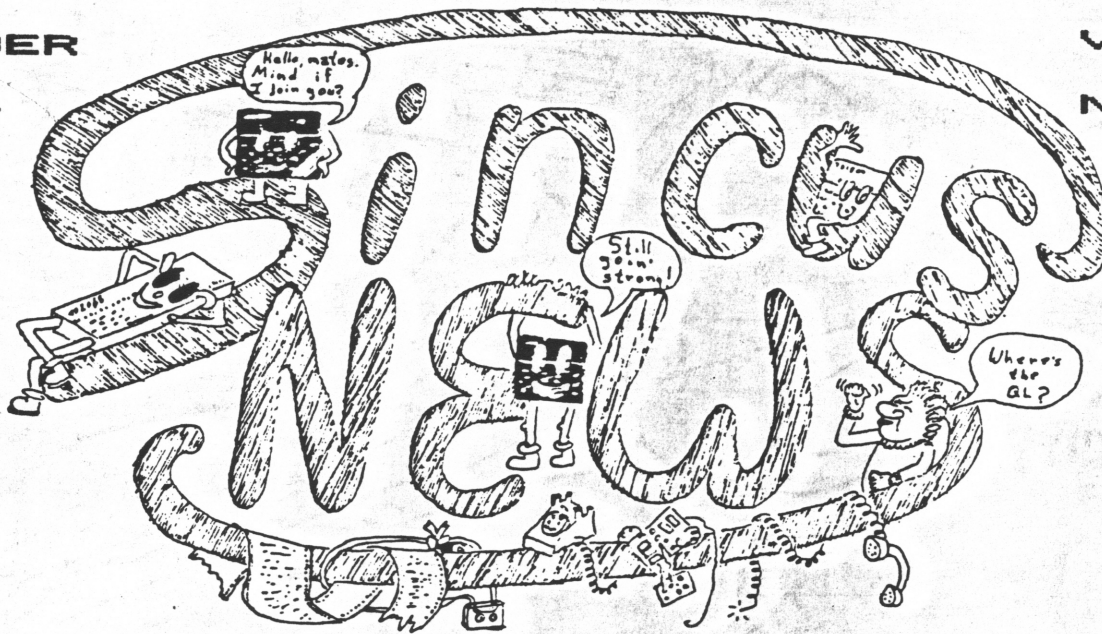


NOVEMBER

1984

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NUMBER 1



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SINCUS ACTIVITIES

TUESDAY

NOVEMBER 20

CLASSES—VESTAL LIBRARY

7:00 PM

WEDNESDAY

NOVEMBER 21

MONTHLY MEETING

CHASE/FIRST CITY BANK

VESTAL PARKWAY BRANCH

7:00 PM

TUESDAY

DECEMBER 18

CLASSES—VESTAL LIBRARY

7:00 PM

WEDNESDAY

DECEMBER 19

MONTHLY MEETING

CHASE/FIRST CITY BANK

VESTAL PARKWAY BRANCH

SECRETARY'S REPORT



SINCUS meet at the Chase/1st City Bank Branch on the Vestal Parkway, Vestal, NY at 7pm, Wednesday, October 17. 22 in attendance.

Gary Ennis, President, opened the meeting, with comments for the requirements for articles to be printed in the newsletter to be 46 columns wide and in by the EXCOM (EXecutive COMmittee Meet) which is generally the 1st Wednesday of the month. November 7 is next EXCOM. For your info the EXCOM's are open to SINCUS members, it is usually at the Vestal Public Library in the conference room.

Paul Hill, Rec Secty, gave a report on the Computer Chess-O-Rama held October 14 at the Vestal Library. The match was held last Sunday at 2pm, between the Sinclair computers and a Radio Shack TRS 80 64K Color computer and Commodore 64 (two) with Atari dropping out the day before. The C64's used SARGON 2 and whipped the ZX81 and the TS 2068 using Voice Chess. A bright note was "The ChessPlayer" on a 2068 which beat the TRS 80's "Microchess", one game at level 2, and was ahead in a level 8 match when the game was finally called due to the hour and no night lights were available. The idea and driving force behind the venture was Ted Koranye (whose picture appeared with ZX81 in the Monday Press) and he deserves the credit. Thanks to those who loaned us your computers for the display of Sinclair computers, a ZX80 to the TS2068. Much thanks to all who came and helped out, with an Extended thanks mode to Stan Livingston and Scot Eddy for their help.

Last chance for price reduction on the 2050 type modems. See Dave Schoenwetter for sign up sheet. Prices starting to rise on many items.

Rec Secty note: REGULAR MEMBERSHIP DUES are pro-rated....if you owe or bring in dues for a friend, the dues are from July to July. Overpayment, if done by check will be credited towards next years dues. If your dues were due two months ago, then you owe from that month until next July. We are trying to get every one paying as of July. Next year, many have dues coming due before July, in the interest of saving the Financial Secretary's sanity, please check by April 1985 as to when your dues are due, and then have your check for your dues in the Financial Secretary's hands by July. Thank you for your cooperation.

Dave Schoenwetter demonstrated his handmade serial/centronics I/F which he had hooked up to Gary Ennis' Gemini 10X printer, and a modem which ran tapes of previously recorded BBS messages. Dave gave an idea of the problems of designing and building the I/F, plus he gave an overview of the local BBS's, their ops and pluses.

John Sims, Trustee, gave a couple reviews of recent books he had found, three he liked were "The Sinclair 2000 Explored", "The Working 2068" and "50 Programs for the 2068".

Wes Brzozwski talked on the Spectrum ROM and the potential for all the Spectrum programs on the market being used in the 2068. Wes had a copy of the emulator sold by the Triangle User Group. He also had the Spectrum ROM mounted so it could plug into the command cartridge port. With a small (4 byte) MC program loaded in off tape, he could switch via software the Spectrum ROM on and off. Wes had ordered several books and programs direct from England and had received all, at about half the price being advertised by commercial outlets in the USA. Using a Color monitor and running "Manic Miner" and "Sabre Wulf", one could appreciate the programming quality that goes into the English programs. You can just drool over some of the programming effects that they had with the Spectrum.

We won't mention Gary's trip home, ok gang?

Paul Hill
Rec Secty

CONGRATULATIONS TO:

**CHARLIE LECHER, SINCUS
ON HIS ELECTION AS THE
PRESIDENT, IBM MICR COMPUTER CLUB**

All about SIR Clive

The British newspaper "The Guardian" has named Clive Sinclair as the 'Young Businessman of the Year'. The award caused some amusement as Clive claims neither to be young nor a businessman. At 28 he is more than twice the age of many of the young entrepreneurs now reputed to be making vast sums from the rapid growth of the home computing market in Britain. (page 14 tsu 1:2)

Sinclair Research claimed to be the first to have sold more than 1 million home computers. As of April 1983, 130,000-ZX80
750,000-ZX81
200,000-ZX Spectrum
600,000-TS1000

Currently (as of April 1983) 200,000 Sinclair or TIMEX-Sinclair computers are being sold each month. (tsu-page 14. 1:2)

FROM "THE PARADOXICAL WORLD OF CLIVE SINCLAIR".

According to this article-which may have some dates screwed up; Clive had the 1st pocket calculator (1972??) and the 1st pocket TV (1977) and the 1st home computer under \$100 (1983).

Sinclair has had no formal electronic training and opted not to go to a university, preferring to learn on the job. He worked briefly as a journalist before setting up his own company in 1962. Radio and amplifier kits were his 1st products with hi-fi systems added in the late 1960's. During these formative years he established the principles which govern almost all of Sinclair's products-miniaturizing approach, low cost for high performance and a high quality appearance. Clive's success wasn't overnight. His aggressive style has not always met with approval. Once in the late 1970's as Sinclair worked on digital watches, pocket TVs, and industrial instruments, his concentration on research led the company into a troubled period. British government financial aid and the intervention, via the NEB (Britain's National Enterprise Board) followed. Disagreeing with the NEB's cautious policy on consumer electronics, Sinclair moved out to establish a new company, Sinclair Research, and to vindicate (sic) himself entirely with the personal computer.

Beginning with the ZX80 and an initial staff of seven, Sinclair Research has grown rapidly. Sales grossed over 130000 units for the ZX80 and over a million for the ZX81/TS1000. Measuring just 6" x 6 1/2" x 1 1/2" the ZX81 took the idea of mini computers to its logical conclusion. Using a 4 chip design based on a Sinclair designed ULA it maximizes hi-performance for low cost-currently \$69 in the USA- and presents a hi-quality appearance, confirmed by the UK's Design Council Award. Behind this product lies an intergrated design approach stemming from a clearly defined business philosophy. Out of its manufacturing arrangements with TIMEX grew the present agreement which in return for a royalty on all sales, licenses TIMEX to use Sinclair technology and name to manufacture and market personal computers, peripherals and software in North America. Sinclair believed that TIMEX with marketing and manufacturing expertise in North America could prove a formidable combination. The agreement covers present and future developments at Sinclair together with TIMEX's own development of the basic technology. There is no theoretical restriction on the potential of new computers. Late in 1983 Clive expects to launch a new 2" pocket tv incorporating advanced flatscreen technology. A color version will follow. On the non-tech side to Clive is his love for poetry. He is also a trustee of the Cambridge Symphony Orchestra and chairman of the British Mensa Society. (tsu page 66-67 1:2)

The miniaturization of computer technology is central to Sir Clive's success. After leaving school he became a journalist specializing in technology for four years before starting his own company in 1962. That company Sinclair Radionics sold radio and amplifier kits by mail order later branching out into computer electronics. (tsu page 42 1:6)

In the Queen's official birthday honors list, Clive Sinclair received knighthood, the establishment's seal of approval. The Queen usually relies on the Prime Minister of the day to advise her. Margaret Thatcher is known to be a fan of Clive's. Although in a recent interview he said he would not be voting for her in the elections, she took an early Spectrum to Japan, to show what British enterprise could do when she visited the Far East last year (1982)...the news that he has taken an option on the former DeLorean car factory in Belfast, N. Ireland. (tsu page 59 1:4)

Sinclair formed a company called "Sinclair Vehicle Project" and bought the DeLorean plant in Ireland. Lotus has already modified it to old sophisticated lightweight vehicles. Sinclair has stated his theory that, if you can't lighten the batteries you should make the batteries fit the vehicle and/or make them more efficient. His method for doing the latter is to use a chip to chop the the vehicle demand on power into time slices of milli or nanoseconds. In other words deliver power for one millisecond and rest for two. Apparently this extends the discharge time time enormously. (SYNC page 33 4: 2) Question from CC to Clive: "...how long has the ZX80 been in development?" " It started in March 1979 and it was put on the market in February 1980."-CS " How many people were involved?" " There were very few people involved really. I had the orginial idea and some of the system ideas. Then there were about two or three engineers who were involved in the detail and design;one engineer in particular did the final design and one wrote the software."-CS (from Creative Computing 12/80 page 111)

tsu= timex/sinclair user, born in the spring of 1983 died in the winter of 1983-84.

SYNC= a Ziff/davis publication born in 1980 (I guess) and also died in the cold of winter 1984.

WHEN WRITING TO ENGLAND-
INSTEAD OF WRITING ----- WRITE

waiting line	queue
color	colour
catalog	catalogue
inquiry	enquiry
check	cheque
TS1000	ZX-81
TS2068	US version of the SPECTRUM
VISA card	Barclaycard
MASTERCARD	ACCESS card
favorable	favourable
AC power line	mains
mail (noun or verb)	post
lawyer	solicitor

Conduct yourself so that you'll never need to use that last item; also avoid slang. Some of it is so commonly used, it may not be obvious to us, so carefully reread your letter before mailing it. I've noticed that the expression "ripoff" has made it overseas, but since we're trying to make a good impression, I can't think of any reason you should use it!

Anyone in England who gets this newsletter (or an unauthorized copy!) may cheerfully read the list backwards as a guide to writing to America. Also, any updates or corrections are appreciated.

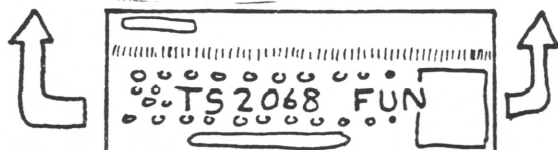
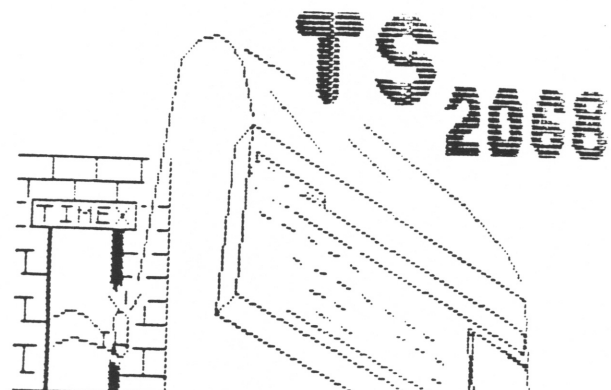
Wes Brzozowski
SINCUS

Ed Note-
Football in England is soccer!

```

5 REM billboard
10 REM John Colonna,SINCUS, enhanced from a program by Kenneth B. Duda
15 CLS
20 INPUT "Enter your message (up to 32 characters). Space after each word.";a$
25 CLS
30 GO SUB 100
35 LET a$=a$(2 TO )+a$(1)
40 PRINT AT 10,(32-LEN A$)/2;PAPER 7; INK 0;a$
45 PAUSE 8: GO TO 35
100 BORDER 1: PAPER 1: CLS
105 FOR i=0 TO 31
110 PRINT AT 7,i; PAPER 7; INK 0;"="
115 PRINT AT 8,i; PAPER 7; INK 0;"+"
120 PRINT AT 9,i; PAPER 7;" ";AT 10,i;" ";AT 11,i;" "
125 PRINT AT 12,i; PAPER 7; INK 0;"+"
130 PRINT AT 13,i; PAPER 7; INK 0;"="
135 NEXT i
140 RETURN
199 SAVE "billboard" LINE 1: BE
EP 1,32

```



**NATIONAL NEWS
FROM LOCAL T/S UG'S
AROUND THE COUNTRY**

N. CAROLINA

From Triangle Sinclair User's Group, their May, June, and July Newsletter, has a machine code peeker (available in Library on tape) and an article on machine code (part 3). There is a program on "Understanding Sinclair Basic", and it is listed out. For 1000 users a Pseudo ROM program. And there are a lot of nuggets of varied value in their letter...its on the bulletin board at the meet. Subscription info available. Apparently they issue their newsletters on an irregular schedule. From all accounts it's a high quality newsletter.

NEW PRODUCTS ?

From Curry Computers-the Trivia Machine for the 2068. \$24.95 5344 West Banff Lane, Glendale Arizona, 85306.

Sharp's, 127 Nine Mile Road, Sandston, VA 23150 lists LDISAM-\$14.95-decimal disassembler.

BASLOAD-19.95-1000 programs(BASIC) to 2068. Translates 1000 code to 2068.

WORD-MOST-19.95-a WP program for 2040 or Aerco Centronics IF.

MTOS-14.95-program development utility, hexenter-bin-linloc-merge-save-lprint

Smart II available now from various vendors- Dave Schoenwetter reviewed already! Using his 2068 talking to his IBM PC, he was able to see it work and UNDERSTAND the documentation. It works- but remember it works at 300 baud. Same as the 1000 loaded off the tape recorder. 27K would load in some 14 minutes. Not bad if local calls involved, Long Distance rates will eat a hole in your budget if you plan a lot of uploading across country. There are some bugs, and it takes some getting used to, with Dave's mini-phone system, it is cheaper than learning the LD way. If you have a modem or are thinking about one, the pluses and minuses at the next meet.

CALIFORNIA

From Timex Users Group, Merced CA, Ed Burton, writes that there is a 1000-1500 Smart II modem program available but not yet marketed by Micro-Systems. Apparently they are sitting on it waiting for the demand. So either check with Micro-Systems or with:

TIMEX USERS GROUP
c/o Ed Burton
1624 Loughborough Drive
Merced, CA 95340

FLORIDA

Magazine-"Sinclair/Timex Users Magazine" give a few tips from the TSUG of Cincinnati re: the 2050 type modem with the Aerco IF (its at the meetings on the bulletin board.) The editor of SUM says..."When call waiting beeps on your line while using the modem, you can usually have spurious characters or a crash. If you get locked up and have to turn off the computer to restart. Many times, depending on who you are talking to, the host computer will not realize you have left and go on waiting for you to send something. I have actually been cut off and dialed the mainframe back up and still be on line and in my account! I would hate to think what would have happened if someone else had dialed up in that time I was off line".

For the 81/1000 users the SUM mag is continuing to run a how to repair a 81/1000, article.

VIRGIN ISLANDS

Game software for the 1000/81 for sale from a Jimbo Harris, Box 7581, St. Thomas, Virgin Islands 00801. A sample game for \$5. If you write tell them you read about it here!

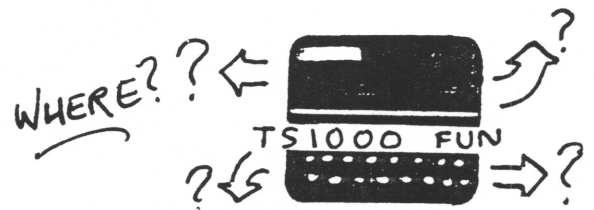
NEW YORK

From Long Island S/T UG's newsletter, "LISTING" an article on Tasword and Olivetti Interfacing. A letter from Timex, a review of the 2000 Winky board, all in all a very informative letter.

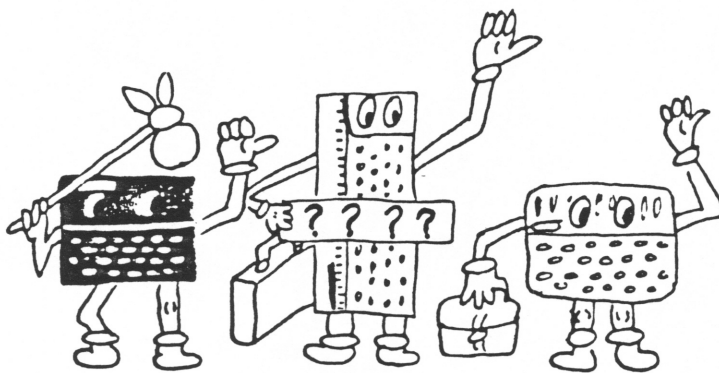
OREGON

In this month's issue of the PLOTTER from the Clackamas County Area T/S UG (Oregon) there is much on USER DEFINED Characters for the 2068 and the 1000!

PAUL HILL
SINCUS



NO TS1000 FUN



WHERE DO WE GO FROM HERE ?

Being an ongoing yet conveniently intermittent column of reviews, ranting, raving, and free advertising for those who catch the attention of:

WES BRZOWSKI

Knowing this, then, the reader may well imagine how difficult it is for me to track down what remaining ZX-81 products may be found. Nevertheless, I'm now happy to list a few high quality, low cost, British products for the ZX-81. I'll give the product's name, price, description, and the name of its manufacturer. This should be enough information for the Cambridge Computer Store (address is listed later) to order it for you. When ordering, be sure to mention the manufacturer's name along with the name of the product and the fact that it's for the ZX-81. There are so many, similar sounding titles, it would be easy for you to receive the wrong item, otherwise. Also, unless you can get a check drawn on Pounds Sterling, you'll have to charge the order to your VISA or MASTERCARD. Postage and shipping costs will, of course, be added.

In the arcade area, QUICKSILVA is offering two ZX-81 games on one tape. For 3.95 pounds, you can get Galaxians (like the Arcade game of that name) and Gloops (a Pac-Man clone). Another company, Fawkes Computing, sells the Gamestape One for the ZX-81, which contains two arcade games, an arcade strategy game, and an adventure game; all four on one tape for 5.95 pounds.

Near the end of TIMEX' home computer venture, some high resolution utility programs for the ZX-81 appeared in the U.S.. These were fairly limited and quite expensive. Computer Rentals Ltd. sells what is reportedly a very nicely done hi-res package for the ZX-81 that is so complete it even includes utilities for arcs, lines, and circles. The price is 5.95 pounds. If high resolution utilities had become available sooner, there'd probably be a good many hi-res games available. One of the very few software houses that still is producing new ZX-81 software has begun to do this. Software Farm presently offers two hi-res ZX-81 games (with more reportedly in the works) called Rocket Man and Forty Niner. They cost 5.95 pounds each.

It shouldn't be surprising that this column has emphasized British sources of product support; that's where "the action is", these days. However, some readers have wondered why this column has so strongly favored the TS2068/SPECTRUM, while almost ignoring the ZX-81/TS1000. The reason is not obvious to those only familiar with the American marketplace, but it's a good one, and I'll do my best to explain it.

In our country, the TS1000/ZX-81 were made and sold for quite a while. In contrast, the TS2068 was available only a few months before TIMEX left the business. As a result, most of the available software was for the TS1000; the TS2068 market never had time to grow to a respectable level. (It's lackluster sales didn't help either). Because of this, we may come to expect that the overseas ZX-81 market is correspondingly large.

However, the TS2068's counterpart, the ZX-Spectrum, has been available for a long time in England. Not only is it by far the best selling computer over there; its production levels are still increasing. It is projected that, by the end of the year, Sinclair will make more Spectrums in a month than TIMEX made through the TS2068's full production life! This is even more dramatic when we consider that TIMEX reportedly sold less than a third of those units before dropping out. When we also consider the differences in the total populations of England and the US, we see that the Spectrum is a very HOT ITEM over there!!!

The ZX-81 (TS1000), on the other hand, is fading near obscurity. Many software producers have discontinued their ZX-81 lines altogether, and others continue to sell their old products but only through British retail stores, since it doesn't pay to advertise them. Very little new ZX-81 software is being produced.

When we look at these prices, and consider that TIMEX charged 15 DOLLARS (about 11-12 pounds) for each TS1000, we can see that these British programs are a bargain, even with overseas shipping costs added. It should be possible to order these or most any other ZX-81 or SPECTRUM product from:

The Cambridge Store
1 Emmanuel Street
Cambridge CB11 NE
ENGLAND

They take VISA and MASTERCARD. Note that this establishment is a retail computer store; they don't have a catalog. Also, please understand that if they don't stock the product you're looking for, they will order it for you, but it will understandably take extra time, as they'll have to wait for their vendors to respond.

If you're writing to this or any other British dealer, and you're requesting information rather than placing an order, be sure to include an International Postal Reply Coupon (65 cents at your Post Office). This will pay the postage on a short reply, will be considered very courteous by some dealers, and will be necessary for a reply from others.

For those in a hurry, an excellent source of SPECTRUM software is:

SOFTWARE SUPERMARKET
87 Howard's Lane
London SW15 6NV
ENGLAND

They take VISA and MASTERCARD, and carry top quality software from numerous vendors. These people have a fixed stock, and so they do have a catalog, but if they don't have what you want, you'll have to look elsewhere.

*** IT ONLY TOOK 10 DAYS BETWEEN ***
*** MAILING MY ORDER AND RECEIVING ***
*** MY ORDERED PROGRAMS ! ! ! ! ! ***

One rarely gets such a fast response even from domestic orders; I was quite surprised!!

Another option is to join a British software club that sells programs at a discount. One such club that appears willing to deal with U.S. customers is:

The Logic 3 Spectrum Club
Mountbatten House
Victoria Street
Windsor SL4 1HE
ENGLAND

They typically cut a pound or more from the price of the programs that they sell, and so buying 2 or 3 tapes pays for the 3 pound membership fee. A group of SINCUS members ordering together could save a considerable amount of money. They take VISA and MASTERCARD.

The British magazines SINCLAIR Programs, SINCLAIR Projects, and SINCLAIR USER have apparently been bought by a new publisher. Its address is EMAP Business and Computer Publications, 67 Clerkenwell Road, London EC1R 5BH, ENGLAND. I don't know their rates or whether they take credit cards. I'd appreciate any other information you readers may have.

Another set of British publications that are reportedly quite good are a regular magazine called ZX Computing and a Spectrum cassette magazine called SPECTRUM Computing. The only information that I have is their address:

ZX COMPUTING
1 Golden Square
London W1R 3AB
ENGLAND

If anyone writes for more information, please let me know what you hear.

Some people have wondered how much I spend on postage with all of the letters I'm writing and answering, particularly with all the overseas postage involved. (Don't forget that overseas postage is 40 cents; more if you include more than one sheet of paper in your envelope). The answer to that question is, "too much", which is why I'm presenting some of the addresses for interested readers to make the contacts. I'm trying to get and pass on as much information as I can, but I really must control my costs if I'm to continue. Because of this, I have to ask that those writing to me include a stamped self addressed envelope, if a reply is expected. This isn't necessary for those who are also contributing information. Those people can do most anything they want and I'll be most happy.

My address?? Oh yes, here it is again
Wes Brzozowski
337 Janice Street
Endicott, New York 13760

People with questions or information are welcome to write, and I'll try to answer as quickly as I can. (Your inclusion of useful information will insure a speedy reply).

I should include one more note on ordering from England. We want to make a good impression on our British friends, so I've emphasised writing courteously, in business format. A sample of the format that I use will be at the SINCUS Meeting. You may take a copy to use to order about anything, just about anything. It took several months to arrive at the wording, and I now use it as the basis for most all of my initial correspondence; free to make use of it.

By WES BRZOZOWSKI, SINCUS

UNIVERSAL LROS/AROS

DEVELOPMENT BOARD

A PROJECT FOR ADVANCE TS2068 USERS

By WES BRZOZOWSKI, SINCUS

True aficionados of the TS2068 will eventually decide that they want to do something with their cartridge port. Although TIMEX produced a few plug in cartridges, many of us have our own special programs in mind. Those looking for an EPROM cartridge are recommended to write to:

John Oligier
11601 Whidbey Drive
Cumberland, IN 46229

John sells a very nice printed circuit board (for \$10.95, last time I checked) as well as EPROM programmer for the TS2068. With these, and some programming information from the TS2068 Technical Manual, you can produce your own plug in software.

There will be a few people who need a more versatile board, able first to be an EPROM cartridge, switchably memory mapped, so that it can function either as an AROS or KROS.

(The TS2068 Technical Manual, pp 115-125, explain the difference.) They may also want the option to run it with RAM memory, so that they can develop programs quickly, or copy in SPECTRUM or TS2068 BASIC and immediately make changes in the BASIC interpreter. If the code could be changed, a write protect switch would then be very helpful. Also useful would be a switch to disable the cartridge without unplugging it. There may also be those with highly demanding requirements (and lots of money) who would prefer to run with EEPROM's (electrically erasable PROM's), which give the nonvolatility of an EPROM and the fast change capability of a RAM memory.

The circuit shown will do all of those things! The "untraditional" but perfectly acceptable way of wiring the memory control signals allows compatibility with 2764 EPROMs, 8264 EEPROMs and 6264 static RAMs. All are 8K by 8 memory chips; access times should be 300 nanoseconds or less. The positions of the four switches depend on the type of memory plugged in and how it's to be used. Before reading further, it is suggested that the reader review

the TS2068 Technical Manual, and thoroughly understand the difference between the home memory bank and the cartridge bank, and how to switch various chunks on and off.

When running with EPROMs, the write enable switch should always be open. This disables the write mode, which EPROMs won't use here, anyway. When running with RAM or EEPROM, write enable will be closed when the code is being entered, and probably opened after that. In the open position, it acts as a "write protect" switch, preventing the code in the memories from being accidentally written over. This is particularly important for EEPROMs, that can't be endlessly written into, as can RAM. There's an additional write protect function, activated by software, that takes advantage of the TS2068's bank switching architecture. This will be explained later.

Along with another switch (more on that in a moment), the read enable switch must be closed for the cartridge memory to be read by the computer. When the switch is open, the computer won't be able to "see" the cartridge circuitry, and it is effectively disabled. This is preferable to unplugging the cartridge, since the cartridge connector inside the computer will eventually wear out.

In order to read the cartridge memory, however, either the AROS or LROS switch must be closed. When LROS is closed, the memory is read from locations 0000-3FFF in the cartridge bank. This is how it would be set for SPECTRUM emulation. For cartridge based programs that need the BASIC ROM, the AROS switch should be closed instead. The cartridge memory is then mapped from 8000-BFFF in the cartridge bank.

When the write enable switch is closed, and RAM or EEPROM memories are installed, it is possible to write into the cartridge. The cartridge is written into from locations C000-FFFF in the cartridge bank (Note that this is a different area from either of the places the cartridge may be read from. Note also that the cartridge is always read from or written to in the cartridge memory bank, never from the home bank. This means that the cartridge bank must be enabled in whatever memory locations the cartridge is to be used.)

At first it may seem strange that the cartridge is written to and read from entirely different memory locations. Yet once we see that the cartridge isn't intended to be a RAM extension board, it turns out to be a great advantage.

Since the circuit is intended to help in developing cartridge software, it's useful to have an easy way to make small changes in the code already loaded. Since the write addresses start at location C000 (49152, decimal) it's very easy to make changes using BASIC. Since the write addresses are at the top of memory, there's still lots of room for BASIC programs.

UNIVERSAL LROS/AROS DEVELOPMENT BOARD

The lines:

CLEAR 4915,1

OUT 244,192

make the cartridge memory available for POKE-ing, starting at its first byte at location 49152. When done with the changes, the line

OUT 244,0

will disable the cartridge bank, including its write address area at C000-FFFF. It also acts as the aforementioned "software write protect switch", since there's rarely any other reason to enable the write address portion of the cartridge bank. This means that the write enable switch needn't be open to protect cartridge memory, except in highly unusual circumstances. (Still it wouldn't hurt.)

It may now be obvious why, however simple the circuit is, this project is not for beginners. In order to use (or even debug) the circuit, a fairly thorough technical knowledge of the TS2068 is necessary. As if this weren't bad enough, the small size of the board will require excellent soldering skills, if you want the cartridge to be small enough so that you can close the door of the cartridge port. In this case, the large amount of wire in the small available space can create heavy "wads" underneath the board, preventing it from fitting, unless you use #30 wire, carefully bundled and tied at various points to keep it spread apart. The bundling scheme will also have to be arranged so as not to have your earlier wiring getting in the way of your later wiring.

One final tip; if you install RAM memory, don't try to LOAD the code from cassette directly into the cartridge memory. It won't work, since the LOAD routine seems to insist on loading data into the home memory bank. LOAD the code into 8000-BFFF in home memory, open the write addresses using the two BASIC lines given, and then transfer the 8000-BFFF block of code into C000-FFFF. This transfer is very slow in BASIC, but can be done in a flash in machine code, and quite easily, if the LDIR instruction is used. This ease is only possible because the read and write addresses are different.

What's the gadget good for? Well, to start, it can be used as a SPECTRUM emulator, although it wouldn't be wise to build one only for that reason, since commercial emulators are simpler, cheaper, and come ready made. However, if you also want to develop new languages for the TS2068, or develop other plug in programs to be later committed to

EPROMs, it's a natural. You can modify the SPECTRUM code to include extra functions like AUTO line numbering and RENUMBER; two functions that should have been included in the TS2068, but weren't. These will greatly speed up your entry and debugging of BASIC programs, and there's over 1100 bytes of unused memory in the SPECTRUM 16K BASIC, so there's lots of room to add them without deleting other things. One very useful feature would be to patch the SPECTRUM LOAD routine to print at the necessary information that would allow you to SAVE a headerless datablock. Headerless blocks are often used in commercial SPECTRUM software to make it difficult to copy. One thing that has me excited is the idea of using the cartridge to modify SPECTRUM BASIC to where all BASIC commands work in 64 column mode!!!

Well, there it is. It's a bit of work to build (and not cheap either), but if you like machine code, it will open up many doors never before available to you. Local SINCUS members have seen it demonstrated as a SPECTRUM emulator, and I'll be glad to answer any new questions at upcoming meetings. Others who read this are welcome to write:

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Please, PLEase, PLEASE enclose a stamped self addressed envelope if you want a reply. I'll try to answer promptly. Good luck and have fun

Wes Brzozowski
SINCUS

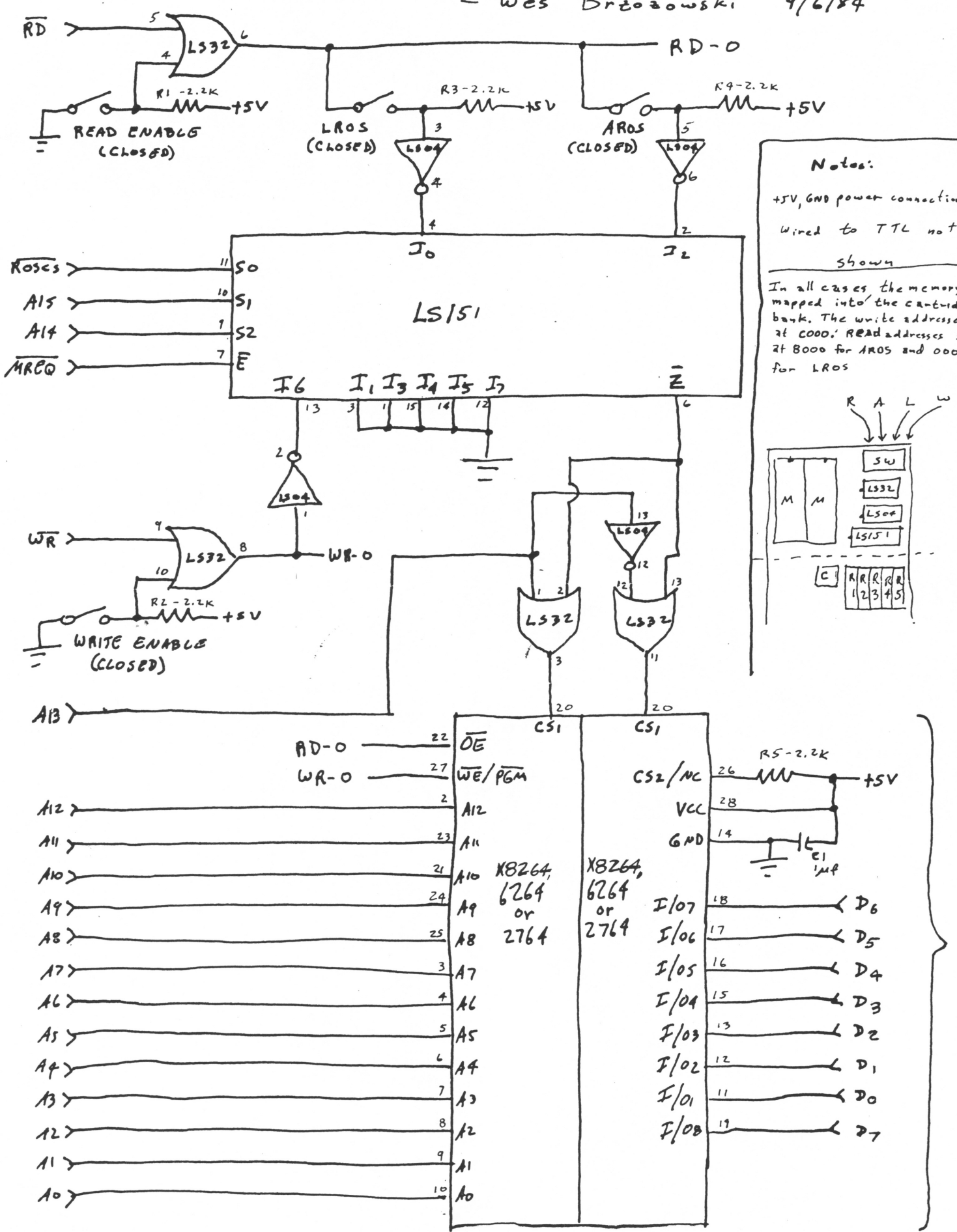


Sometimes the Dragon Wins

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THANKS TO DAVE SCHOENWETTER, SINCUS

Universal LROS / AROS / Development Board

- Wes Brzezowski 9/6/84



Attach horizontal connections (both sides) to both devices